

BCSE103E -
Computer Programming: Java
Digital Assignment – 2

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1. String formatting

CODE

```
// JAVA DA - 2
// by Dhruv Rajeshkumar Shah
// 21BCE0611

public class StringFormatting {
    public static void main(String[] args) {
        String name = "Dhruv";
        int age = 19;
        double cgpa = 9.5;
        String lang = "Java";

        // String Formatting
        System.out.printf("My name is %s, I am %d years old and my CGPA is %.2f\n", name, age, cgpa);
        System.out.printf("I am learning %20s", lang);
    }
}
```

OUTPUT

```
dhruv@Titan /c/Dhruv/VIT/Semester-3/Java/Lab/DA-2 (main)
oaming\\Code\\User\\workspaceStorage\\21ff192e9061f75a39b0
My name is Dhruv, I am 19 years old and my CGPA is 9.50
I am learning                Java
```

2. String practise 1

CODE

```
// JAVA DA - 2
// by Dhruv Rajeshkumar Shah
// 21BCE0611

public class StringPractise1 {
    public static void main(String[] args) {
        String str1 = "Dhruv";
        System.out.println(str1);

        String str2 = "DHRUV";
        System.out.println(str2);

        char c[] = { 'D', 'h', 'r', 'u', 'v' };
        String str3 = new String(c);
        System.out.println(str3);

        byte b[] = { 68, 104, 114, 117, 118 };
        String str4 = new String(b);
        System.out.println(str4);

        String str5 = new String("Dhruv");
        System.out.println(str1 == str5);
    }
}
```

OUTPUT

```
dhruv@Titan /c/Dhruv/VIT/Semester-3/Java/Lab/D
$ /usr/bin/env C:\\Program\\ Files\\Java\\jdk-1
\\21ff192e9061f75a39b0298449d613e0\\redhat.java
Dhruv
DHRUV
Dhruv
Dhruv
false
```

3. String practise 2

CODE

```
// JAVA DA - 2
// by Dhruv Rajeshkumar Shah
// 21BCE0611

public class StringPractise2 {
    public static void main(String[] args) {
        String str = new String("  Dhruv  ");

        System.out.println(str.length());
        int len = str.length();
        System.out.println(len);

        String str1 = str.toUpperCase();
        System.out.println(str1);

        str = str.trim();
        System.out.println(str);

        String str2 = str.substring(3);
        System.out.println(str2);

        String str3 = str.substring(2, 4);
        System.out.println(str3);

        String str4 = str.replace('D', 'd');
        System.out.println(str4);

        System.out.println(str4 + " " + str);
    }
}
```

OUTPUT

```
dhruv@Titan /c/Dhruv/VIT/Semester-3/Java/Lab/DA-2 (ma
\\bin StringPractise2 oaming\\Code\\User\\workspaceSt
11
11
  DHRUV
Dhruv
uv
ru
dhruv
dhruv Dhruv
```

4. String practise 3

CODE

```
// JAVA DA - 2
// by Dhruv Rajeshkumar Shah
// 21BCE0611

public class StringPractise3 {
    public static void main(String[] args) {

        String str1 = "Mr. Dhruv Shah";
        System.out.println(str1.startsWith("Mr."));
        System.out.println(str1.startsWith("Shah", 4));
        System.out.println(str1.endsWith("Dhruv"));
        System.out.println(str1.charAt(4));

        for (int i = 0; i < str1.length(); i++)
            System.out.println(str1.charAt(i));

        String str2 = "www.udemy.co.in";
        System.out.println(str2.indexOf("."));
        System.out.println(str2.indexOf(".", 4));
        System.out.println(str2.indexOf("udemy"));
        System.out.println(str2.lastIndexOf("."));
    }
}
```

OUTPUT

```
dhruv@Titan /c/Dhruv/VIT/Semester-3/Java/Lab/DA-2 (main)
ceStorage\\21ff192e9061f75a39b0298449d613e0\\redhat.java\\jdt_ws\\DA-2_b95285c
true
false
false
D
M
r
.
D
h
r
u
v
S
h
a
h
3
9
4
12
```

5. String practise 4

CODE

```
// JAVA DA - 2
// by Dhruv Rajeshkumar Shah
// 21BCE0611

public class StringPractise4 {
    public static void main(String[] args) {

        String str1 = "Pyramid";
        String str2 = "pyramid";
        String str7 = new String("Pyramid");

        System.out.println(str1.equals(str2));
        System.out.println(str1.equalsIgnoreCase(str2));
        System.out.println(str1 == str2);
        System.out.println(str1 == str7);

        String str3 = "china wall";
        String str4 = new String("china tall");

        System.out.println(str3.equals(str4));
        System.out.println(str3.compareTo(str4));

        String str5 = "the great wall ";
        String str6 = "of china";
        System.out.println(str5.contains("wall"));
        System.out.println(str5.concat(str6));
        System.out.println(str5 + str6);
    }
}
```

OUTPUT

```
dhruv@Titan /c/Dhruv/VIT/Semester-3/Java/Lab/DA-2 (main)
$ /usr/bin/env C:\Program Files\Java\jdk-11.0.11\bin
\\21ff192e9061f75a39b0298449d613e0\redhat.java\jdt_ws\D
false
true
false
false
false
3
true
the great wall of china
the great wall of china
```

6. String practise 4

CODE

```
// JAVA DA - 2
// by Dhruv Rajeshkumar Shah
// 21BCE0611

public class StringPractise5 {
    public static void main(String[] args) {

        String str1 = "f";
        System.out.println(str1.matches("."));

        String str2 = "a";
        System.out.println(str2.matches("[abc]"));

        String str3 = "p";
        System.out.println(str3.matches("[^abc]"));

        String str4 = "7";
        System.out.println(str4.matches("[a-zA-Z0-9]"));

        String str5 = "b";
        System.out.println(str5.matches("a|b"));

        String str6 = "b";
        System.out.println(str6.matches("\\w"));

        String str7 = "5";
        System.out.println(str7.matches("\\d"));

        String str8 = "$";
        System.out.println(str8.matches("\\D"));

    }
}
```

OUTPUT

```
dhruv@Titan /c/Dhruv/VIT/Semester-3/Java/Lab
\\bin StringPractise5 oaming\\Code\\User\\wo
true
true
true
true
true
true
true
true
```

7. Email, domain and username

CODE

```
// JAVA DA - 2
// by Dhruv Rajeshkumar Shah
// 21BCE0611

public class Email {
    public static void main(String[] args) {
        String email = "dhruvshahrds@gmail.com";

        int i = email.indexOf("@");
        String username = email.substring(0, i);
        String domain = email.substring(i + 1);
        System.out.println("Username: " + username);
        System.out.println("Domain: " + domain);

        int j = domain.indexOf(".");
        String domainName = domain.substring(0, j);
        System.out.println(domainName.equals("gmail"));

    }
}
```

OUTPUT

```
dhruv@Titan /c/Dhruv/VIT/Semester-3/Java/Lab/DA-2 (main)
$ /usr/bin/env C:\\Program\\ Files\\Java\\jdk-11.0.11\\b
\\21ff192e9061f75a39b0298449d613e0\\redhat.java\\jdt_ws\\
Username: dhruvshahrds
Domain: gmail.com
true
```


8. Number system checking

CODE

```
// JAVA DA - 2
// by Dhruv Rajeshkumar Shah
// 21BCE0611

public class NumberSystemCheck {
    public static void main(String[] args) {

        int b = 100110010;

        String str = String.valueOf(b);

        System.out.println(str.matches("[01]+"));

        String str1 = "B234AB";
        System.out.println(str1.matches("[0-9A-F]+"));

        String str2 = "20/10/2022";
        System.out.println(str2.matches("[0-3][0-9]/[0-1][0-9]/[0-9]{4}"));

    }
}
```

OUTPUT

```
dhruv@Titan /c/Dhruv/VIT/Semester-3/Java/Lab/DA-2 (main)
ceStorage\\21ff192e9061f75a39b0298449d613e0\\redhat.java\\
true
true
true
```

9. String operations – remove spaces, special characters and find numbers

CODE

```
// JAVA DA - 2
// by Dhruv Rajeshkumar Shah
// 21BCE0611

public class StringOperations {
    public static void main(String[] args) {

        String str1 = "a!B@c#1$2%3";
        str1 = str1.replaceAll("[^a-zA-Z0-9]", "");
        System.out.println(str1);

        String str2 = "      abc      def      gh      ijk      ";
        str2 = str2.replaceAll("\\s+", " ").trim();
        System.out.println(str2);

        String words[] = str2.split("\\s");

        System.out.println(words.length);

    }
}
```

OUTPUT

```
dhruv@Titan /c/Dhruv/VIT/Semester-3/Java/Lab/DA-2 (main)
$ /usr/bin/env C:\\Program\\ Files\\Java\\jdk-11.0.11\\bin
\\21ff192e9061f75a39b0298449d613e0\\redhat.java\\jdt_ws\\D
aBc123
abc def gh ijk
4
```

10. Loops

CODE

```
// JAVA DA - 2
// by Dhruv Rajeshkumar Shah
// 21BCE0611

public class Loops {
    public static void main(String[] args) {
        // While loop
        System.out.println("While loop");
        int i = 1;
        while (i < 100)

        {
            System.out.println(i);
            i = i * 2;
        }
        System.out.println("");

        // Do-While loop
        System.out.println("Do-While loop");
        int j = 1;
        do {
            System.out.println(j);
            j = j * 2;
        } while (j < 100);
        System.out.println("");

        // For loop
        System.out.println("For loop");
        for (int k = 1; k < 100; k = k * 2) {
            System.out.println(k);
        }
        System.out.println("");

        // For-Each loop
        System.out.println("For-Each loop");
        int arr[] = { 1, 2, 8, 16, 32, 64 };
        for (int x : arr) {
            System.out.println(x);
        }
        System.out.println("");
    }
}
```

OUTPUT

```
dhruv@Titan /c/Dhruv/VIT/Semester-3/Java/Lab/DA-2 (main)
$ /usr/bin/env C:\\Program\\ Files\\Java\\jdk-11.0.11\\bin\\java.exe -cp C:
\\21ff192e9061f75a39b0298449d613e0\\redhat.java\\jdt_ws\\DA-2_b95285c6\\bin
while loop
1
2
4
8
16
32
64

Do-while loop
1
2
4
8
16
32
64

For loop
1
2
4
8
16
32
64

For-Each loop
1
2
3
4
5
```

11. Infinite loops and unreachable statements

CODE

```
// JAVA DA - 2
// by Dhruv Rajeshkumar Shah
// 21BCE0611

public class Infiniteloop {
    public static void main(String[] args) {
        // Infinite loop
        int i = 1;
        while (true) {
            System.out.println(i);
            i++;
        }

        // Byte infinite loop
        byte j = 1; // Also unreachable statement
        while (true) {
            System.out.println(j);
            j++;
        }
    }
}
```

12. Loop applications

CODE

```
// JAVA DA - 2
// by Dhruv Rajeshkumar Shah
// 21BCE0611

import java.util.Scanner;

public class LoopingApplications {
    public static void main(String[] args) {

        // Multiplication table
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter a number: ");
        int n = sc.nextInt();

        for (int i = 1; i <= 10; i++) {
            System.out.println(n + " x " + i + " = " + n * i);
        }

        // Sum of numbers
        System.out.println("Enter a Number: ");
        int m = sc.nextInt();
        int sum = 0;

        for (int i = 1; i <= m; i++) {
            sum = sum + i;
        }
        System.out.println("Sum of " + m + " Number is " + sum);

        // Factorial
        System.out.println("Enter a Number: ");
        int p = sc.nextInt();
        long fact = 1;

        for (int i = 1; i <= p; i++) {
            fact = fact * i;
        }
        System.out.println("Factorial is " + fact);
        ;

        // Count digit of number
        System.out.println("Enter a Number");
        int s = sc.nextInt();

        int count = 0;
        while (s > 0) {
            s = s / 10;
        }
    }
}
```

```
        count++;
    }
    System.out.println(count);

    // Armstrong number
    System.out.println("Enter a Number");
    int t = sc.nextInt();

    int u = t;
    int v = 0;
    int w;

    while (u > 0) {
        w = u % 10;
        u = u / 10;
        v = v + (w * w * w);
    }

    if (t == v) {
        System.out.println("Armstrong Number");
    } else {
        System.out.println("Not Armstrong Number");
    }

    // Reverse a number
    System.out.println("Enter a Number");
    int x = sc.nextInt();

    int y = x;
    int z = 0;
    int a;

    while (y > 0) {
        a = y % 10;
        y = y / 10;
        z = z * 10 + a;
    }
    System.out.println(z);

    // Palindrome number
    System.out.println("Enter a Number");
    int b = sc.nextInt();

    int c = b;
    int d = 0;
    int e;

    while (c > 0) {
```

```

        e = c % 10;
        c = c / 10;
        d = d * 10 + e;
    }

    if (b == d) {
        System.out.println("Palindrome Number");
    } else {
        System.out.println("Not Palindrome Number");
    }
}
}

```

OUTPUT

```

dhruv@Titan /c/Dhruv/VIT/Semester-3/Java/Lab/DA-2 (main)
bin LoopingApplications ng\\Code\\User\\workspaceStorage\\2
bash: d: command not found
Enter a number: 5
5 x 1 = 5
5 x 2 = 10
5 x 3 = 15
5 x 4 = 20
5 x 5 = 25
5 x 6 = 30
5 x 7 = 35
5 x 8 = 40
5 x 9 = 45
5 x 10 = 50
Enter a Number:
3
Sum of 3 Number is 6
Enter a Number:
5
Factorial is 120
Enter a Number
4
1
Enter a Number
6
Not Armstrong Number
Enter a Number
432
234
Enter a Number
23432
Palindrome Number

```


13. Loop applications 2

CODE

```
// JAVA DA - 2
// by Dhruv Rajeshkumar Shah
// 21BCE0611

import java.util.Scanner;

public class LoopingApplications2 {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);

        // Arithmetic Progression
        System.out.println("Program to print AP Series");
        System.out.println("Enter a, d and n");
        int a = sc.nextInt();
        int d = sc.nextInt();
        int n = sc.nextInt();
        int term = a;
        for (int i = 0; i < n; i++) {
            System.out.print(term + ",");
            term = term + d;
        }
        System.out.println("");

        // Geometric Progression
        System.out.println("Program to print GP Series");
        System.out.println("Enter a, r and n");
        int a1 = sc.nextInt();
        int r = sc.nextInt();
        int n1 = sc.nextInt();
        int term1 = a1;
        for (int i = 0; i < n1; i++) {
            System.out.print(term1 + ",");
            term1 = term1 * r;
        }
        System.out.println("");

        // Fibonacci Series
        System.out.println("Program to print Fibonacci Series");
        System.out.println("Enter n");
        int n2 = sc.nextInt();
        int a2 = 0;
        int b2 = 1;
        int c2;
        System.out.print(a2 + "," + b2 + ",");
        for (int i = 0; i < n2 - 2; i++) {
            c2 = a2 + b2;
```

```

        System.out.print(c2 + ",");
        a2 = b2;
        b2 = c2;
    }
}
}

```

OUTPUT

```

dhruv@Titan /c/Dhruv/VIT/Semester-3/Java/Lab/DA-2 (main)
$ /usr/bin/env C:\\Program\\ Files\\Java\\jdk-11.0.11\\bin\\java.exe -Djava.class.path=\\21ff192e9061f75a39b0298449d613e0\\redhat.java\\jdt_ws\\bin\\java.exe Program to print AP Series
Enter a, d and n
2 4 5
2,6,10,14,18,
Program to print GP Series
Enter a, r and n
2 4 5
2,8,32,128,512,
Program to print Fibonacci Series
Enter n
5
0,1,1,2,3,

```

14 . Patterns

CODE

```
// JAVA DA - 2
// by Dhruv Rajeshkumar Shah
// 21BCE0611

public class Patterns {
    public static void main(String[] args) {
        // Pattern 1
        for (int i = 1; i <= 5; i++) {
            for (int j = 1; j <= 5; j++) {
                System.out.print(j + " ");
            }
            System.out.println("");
        }

        // Pattern 2
        for (int i = 1; i <= 5; i++) {
            for (int j = 1; j <= 5; j++) {
                System.out.print(i + " ");
            }
            System.out.println("");
        }

        // Pattern 3
        for (int i = 1; i <= 5; i++) {
            for (int j = 1; j <= 5; j++) {
                System.out.print(i + j + " ");
            }
            System.out.println("");
        }

        // Pattern 4
        int count = 0;
        for (int i = 1; i <= 5; i++) {
            for (int j = 1; j <= 5; j++) {
                count++;
                System.out.format("%02d ", count);
            }
            System.out.println("");
        }

        // Pattern 5
        for (int i = 1; i <= 5; i++) {
            for (int j = 1; j <= i; j++) {
                System.out.format(j + " ");
            }
        }
    }
}
```

```

        System.out.println("");
    }

    // Pattern 6
    count = 0;
    for (int i = 1; i <= 5; i++) {
        for (int j = 1; j <= i; j++) {
            count++;
            System.out.format(count + " ");
        }
        System.out.println("");
    }

    // Pattern 7
    for (int i = 1; i <= 5; i++) {
        for (int j = 1; j <= i; j++) {

            System.out.format("* ");
        }
        System.out.println("");
    }

    // Pattern 8
    for (int i = 1; i <= 5; i++) {
        for (int j = 1; j <= 5 - i + 1; j++) {

            System.out.format(j + " ");
        }
        System.out.println("");
    }

    // Pattern 9
    for (int i = 1; i <= 5; i++) {
        for (int j = 1; j <= 5 - i + 1; j++) {

            System.out.format(i + " ");
        }
        System.out.println("");
    }

    // Pattern 10
    count = 0;
    for (int i = 1; i <= 5; i++) {
        for (int j = 1; j <= 5 - i + 1; j++) {
            count++;
            System.out.format("%02d ", count);
        }
        System.out.println("");
    }

```

```

    }

    // Pattern 11
    for (int i = 1; i <= 5; i++) {
        for (int j = 1; j <= 5; j++) {
            if (i <= j)
                System.out.print("* ");
            else
                System.out.print(" ");
        }
        System.out.println("");
    }

    // Pattern 12
    for (int i = 1; i <= 5; i++) {
        for (int j = 1; j <= 5; j++) {
            if (i + j > 5)
                System.out.print("* ");
            else
                System.out.print(" ");
        }
        System.out.println("");
    }

    // Pattern 13
    for (int i = 1; i <= 5; i++) {
        for (int j = 1; j <= 5 - i; j++) {
            System.out.print(" ");
        }
        for (int j = 1; j <= 2 * i - 1; j++) {
            System.out.print("* ");
        }
        System.out.println("");
    }
    for (int i = 1; i <= 5; i++) {
        for (int j = 1; j <= i - 1; j++) {
            System.out.print(" ");
        }
        for (int j = 1; j <= 2 * (5 - i) + 1; j++) {
            System.out.print("* ");
        }
        System.out.println("");
    }
}
}

```

OUTPUT

```
dhruv@Titan /c/Dhruv/VIT/Semester-3\\
$ cd c:\\Dhruv\\VIT\\Semester-3\\v\\AppData\\Roaming\\Code\\User\\w
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
1 1 1 1 1
2 2 2 2 2
3 3 3 3 3
4 4 4 4 4
5 5 5 5 5
2 3 4 5 6
3 4 5 6 7
4 5 6 7 8
5 6 7 8 9
6 7 8 9 10
01 02 03 04 05
06 07 08 09 10
11 12 13 14 15
16 17 18 19 20
21 22 23 24 25
1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
1
2 3
4 5 6
7 8 9 10
11 12 13 14 15
*
* *
* * *
* * * *
* * * * *
1 2 3 4 5
1 2 3 4
1 2 3
1 2
1
```

[illegible]

14. Array applications

CODE

```
// JAVA DA - 2
// by Dhruv Rajeshkumar Shah
// 21BCE0611

public class ArrayApplications {
    public static void main(String[] args) {
        // Finding element in array
        int arr[] = { 1, 2, 3, 4, 5, 6, 7, 8, 9 };
        int search = 5;
        boolean found = false;
        for (int i = 0; i < arr.length; i++) {
            if (arr[i] == search) {
                found = true;
                break;
            }
        }

        if (found) {
            System.out.println("Element found");
        } else {
            System.out.println("Element not found");
        }

        // Finding maximum element in array
        int max = arr[0];
        for (int i = 1; i < arr.length; i++) {
            if (arr[i] > max) {
                max = arr[i];
            }
        }
        System.out.println("Maximum element in array is: " + max);

        // Finding minimum element in array
        int min = arr[0];
        for (int i = 1; i < arr.length; i++) {
            if (arr[i] < min) {
                min = arr[i];
            }
        }
        System.out.println("Minimum element in array is: " + min);

        // Finding sum of elements in array
        int sum = 0;
        for (int i = 0; i < arr.length; i++) {
            sum += arr[i];
        }
    }
}
```

```

System.out.println("Sum of elements in array is: " + sum);

// Finding second largest element in array
int max1 = arr[0];
int max2 = arr[0];
for (int i = 1; i < arr.length; i++) {
    if (arr[i] > max1) {
        max2 = max1;
        max1 = arr[i];
    } else if (arr[i] > max2) {
        max2 = arr[i];
    }
}
System.out.println("Second largest element in array is: " + max2);

// Rotating array by left to right
int temp = arr[0];
for (int i = 1; i < arr.length; i++) {
    arr[i - 1] = arr[i];
}
arr[arr.length - 1] = temp;
System.out.println("Array after rotating left to right: ");
for (int i = 0; i < arr.length; i++) {
    System.out.print(arr[i] + " ");
}
System.out.println("");

// Inserting an element in array
int insert = 10;
int pos = 3;
int arr1[] = new int[arr.length + 1];
for (int i = 0; i < arr1.length; i++) {
    if (i < pos) {
        arr1[i] = arr[i];
    } else if (i == pos) {
        arr1[i] = insert;
    } else {
        arr1[i] = arr[i - 1];
    }
}
System.out.println("Array after inserting element: ");
for (int i = 0; i < arr1.length; i++) {
    System.out.print(arr1[i] + " ");
}

// Deleting an element in array
int del = 3;
int arr2[] = new int[arr.length - 1];

```



```

        for (int i = 0; i < arr.length; i++) {
            if (i < del) {
                arr2[i] = arr[i];
            } else if (i > del) {
                arr2[i - 1] = arr[i];
            }
        }
        System.out.println("");
        System.out.println("Array after deleting element: ");
        for (int i = 0; i < arr2.length; i++) {
            System.out.print(arr2[i] + " ");
        }

        // Copying array
        int arr3[] = new int[arr.length];
        for (int i = 0; i < arr.length; i++) {
            arr3[i] = arr[i];
        }
        System.out.println("");
        System.out.println("Array after copying: ");
        for (int i = 0; i < arr3.length; i++) {
            System.out.print(arr3[i] + " ");
        }

        // Copy array in reverse order
        int arr4[] = new int[arr.length];
        for (int i = 0; i < arr.length; i++) {
            arr4[i] = arr[arr.length - i - 1];
        }
        System.out.println("");
        System.out.println("Array after copying in reverse order: ");
        for (int i = 0; i < arr4.length; i++) {
            System.out.print(arr4[i] + " ");
        }
    }
}

```

OUTPUT

```
dhruv@Titan /c/Dhruv/VIT/Semester-3/Java/Lab/DA-2 (main
$ /usr/bin/env C:\\Program\\ Files\\Java\\jdk-11.0.11\\
\\21ff192e9061f75a39b0298449d613e0\\redhat.java\\jdt_ws
Element found
Maximum element in array is: 9
Minimum element in array is: 1
Sum of elements in array is: 45
Second largest element in array is: 8
Array after rotating left to right:
2 3 4 5 6 7 8 9 1
Array after inserting element:
2 3 4 10 5 6 7 8 9 1
Array after deleting element:
2 3 4 6 7 8 9 1
Array after copying:
2 3 4 5 6 7 8 9 1
Array after copying in reverse order:
1 9 8 7 6 5 4 3 2
```

15. 2D Array

CODE

```
// JAVA DA - 2
// by Dhruv Rajeshkumar Shah
// 21BCE0611

public class Array2D {
    public static void main(String[] args) {
        // 2D Array
        int arr[][] = { { 1, 2, 3 }, { 4, 5, 6 }, { 7, 8, 9 } };

        // Printing 2D Array using for loop
        System.out.println("Printing 2D Array using for loop");
        for (int i = 0; i < arr.length; i++) {
            for (int j = 0; j < arr[i].length; j++) {
                System.out.print(arr[i][j] + " ");
            }
            System.out.println("");
        }

        // Printing 2D Array using for-each loop
        System.out.println("Printing 2D Array using for-each loop");
        for (int[] row : arr) {
            for (int col : row) {
                System.out.print(col + " ");
            }
            System.out.println("");
        }
    }
}
```

OUTPUT

```
dhruv@Titan /c/Dhruv/VIT/Semester-3/Java/Lab/DA-2 (main
$ cd c:\Dhruv\VIT\Semester-3\Java\Lab\DA-2 ; /us
v\AppData\Roaming\Code\User\workspaceStorage\21ff
Printing 2D Array using for loop
1 2 3
4 5 6
7 8 9
Printing 2D Array using for-each loop
1 2 3
4 5 6
7 8 9
```

16. Jagged Array

CODE

```
// JAVA DA - 2
// by Dhruv Rajeshkumar Shah
// 21BCE0611

public class JaggedArray {
    public static void main(String[] args) {
        // Jagged Array
        int arr[][] = new int[3][];
        arr[0] = new int[3];
        arr[1] = new int[4];
        arr[2] = new int[2];

        // Printing Jagged Array using for loop
        System.out.println("Printing Jagged Array using for loop");
        for (int i = 0; i < arr.length; i++) {
            for (int j = 0; j < arr[i].length; j++) {
                System.out.print(arr[i][j] + " ");
            }
            System.out.println("");
        }

        // Printing Jagged Array using for-each loop
        System.out.println("Printing Jagged Array using for-each loop");
        for (int[] row : arr) {
            for (int col : row) {
                System.out.print(col + " ");
            }
            System.out.println("");
        }
    }
}
```

OUTPUT

```
dhruv@Titan /c/Dhruv/VIT/Semester-3/Java/Lab/DA-2 (main
ceStorage\21ff192e9061f75a39b0298449d613e0\redhat.jav
Printing Jagged Array using for loop
0 0 0
0 0 0 0
0 0
Printing Jagged Array using for-each loop
0 0 0
0 0 0 0
0 0
```

17. Matrice addition and multiplication

CODE

```
// JAVA DA - 2
// by Dhruv Rajeshkumar Shah
// 21BCE0611

public class Matrices {
    public static void main(String[] args) {
        // Matrix 1
        int[][] matrix1 = { { 1, 2, 3 }, { 4, 5, 6 }, { 7, 8, 9 } };

        // Matrix 2
        int[][] matrix2 = { { 1, 2, 3 }, { 4, 5, 6 }, { 7, 8, 9 } };

        // Matrice addition
        int[][] sum = new int[3][3];
        for (int i = 0; i < 3; i++) {
            for (int j = 0; j < 3; j++) {
                sum[i][j] = matrix1[i][j] + matrix2[i][j];
            }
        }

        // Printing sum of matrices
        System.out.println("Printing sum of matrices");

        for (int[] row : sum) {
            for (int col : row) {
                System.out.print(col + " ");
            }
            System.out.println("");
        }

        // Matrix multiplication
        int[][] product = new int[3][3];
        for (int i = 0; i < 3; i++) {
            for (int j = 0; j < 3; j++) {
                product[i][j] = 0;
                for (int k = 0; k < 3; k++) {
                    product[i][j] += matrix1[i][k] * matrix2[k][j];
                }
            }
        }

        // Printing product of matrices
        System.out.println("Printing product of matrices");

        for (int[] row : product) {
```

```
        for (int col : row) {  
            System.out.print(col + " ");  
        }  
        System.out.println("");  
    }  
}
```

OUTPUT

```
dhruv@Titan /c/Dhruv/VIT/Semester-3/Java/Lab/DA-2 (main)  
$ /usr/bin/env C:\\Program\\ Files\\Java\\jdk-11.0.11\\bin\\java.e  
98449d613e0\\redhat.java\\jdt_ws\\DA-2_b95285c6\\bin Matrices  
Printing sum of matrices  
2 4 6  
8 10 12  
14 16 18  
Printing product of matrices  
30 36 42  
66 81 96  
102 126 150
```

18. Sorting array of strings

CODE

```
// JAVA DA - 2
// by Dhruv Rajeshkumar Shah
// 21BCE0611

public class AscendingOrder {
    public static void main(String[] args) {
        // Array of languages
        String languages[] = { "Python", "JavaScript", "C", "C++", "Java",
"PHP", "C#" };

        // Sorting array
        java.util.Arrays.sort(languages);

        // Printing the sorted array
        for (String language : languages) {
            System.out.println(language);
        }
    }
}
```

OUTPUT

```
dhruv@Titan /c/Dhruv/VIT/Semester-3/Java/Lab/DA-2
\\bin AscendingOrder Roaming\\Code\\User\\workspac
C
C#
C++
Java
JavaScript
PHP
Python
```

19. Wrappers

CODE

```
// JAVA DA - 2
// by Dhruv Rajeshkumar Shah
// 21BCE0611

public class Wrappers {
    public static void main(String[] args) {
        // Declaring and initializing primitive variables
        byte b = 10;
        short s = 20;
        int i = 10;
        long l = 100;
        float f = 10.5f;
        double d = 10.5;
        char c = 'a';
        boolean bool = true;

        // Wrapping primitive variables into objects
        Byte byteObj = b;
        Short shortObj = s;
        Integer intObj = i;
        Long longObj = l;
        Float floatObj = f;
        Double doubleObj = d;
        Character charObj = c;
        Boolean boolObj = bool;

        // Printing the values of objects
        System.out.println("Printing the values of objects");
        System.out.println("Byte object: " + byteObj);
        System.out.println("Short object: " + shortObj);
        System.out.println("Integer object: " + intObj);
        System.out.println("Long object: " + longObj);
        System.out.println("Float object: " + floatObj);
        System.out.println("Double object: " + doubleObj);
        System.out.println("Character object: " + charObj);
        System.out.println("Boolean object: " + boolObj);
        System.out.println("");

        // Unwrapping objects into primitive variables
        byte byteVar = byteObj;
        short shortVar = shortObj;
        int intVar = intObj;
        long longVar = longObj;
        float floatVar = floatObj;
        double doubleVar = doubleObj;
        char charVar = charObj;
```



```

        boolean boolVar = boolObj;

        // Printing the values of primitive variables
        System.out.println("Printing the values of primitive variables");
        System.out.println("Byte variable: " + byteVar);
        System.out.println("Short variable: " + shortVar);
        System.out.println("Integer variable: " + intVar);
        System.out.println("Long variable: " + longVar);
        System.out.println("Float variable: " + floatVar);
        System.out.println("Double variable: " + doubleVar);
        System.out.println("Character variable: " + charVar);
        System.out.println("Boolean variable: " + boolVar);
    }
}

```

OUTPUT

```

dhruv@Titan /c/Dhruv/VIT/Semester-3/Java/Lab/DA-2 (main)
\\bin Wrappers Data\\Roaming\\Code\\User\\workspaceStorage\\2
Printing the values of objects
Byte object: 10
Short object: 20
Integer object: 10
Long object: 100
Float object: 10.5
Double object: 10.5
Character object: a
Boolean object: true

Printing the values of primitive variables
Byte variable: 10
Short variable: 20
Integer variable: 10
Long variable: 100
Float variable: 10.5
Double variable: 10.5
Character variable: a
Boolean variable: true

```